[PB3-13] [10/18/2001 (Thr) 14:00 - 17:00 / Hall D]

Changes in dopaminergic activity following bilateral entorhinal cortex lesions

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To determine the effects of entorhinal cortex lesions on brain dopaminergic activity, rats were bilaterally treated with ibotenic acid (20 nmol) into entorhinal cortex. Ten days after the treatment, various brain regions were dissected out. Changes in the levels of dopamine and its metabolites and the characteristics of dopamine receptors (D-1 and D-2) were determined using HPLC and receptor binding assay, respectively. The levels of dopamine were decreased in entorhinal cortex, hippocampus and frontal cortex (59.1, 75.1 and 22.8%, respectively), but not in striatum. The levels of hippocampal and frontal cortical dihydroxyphenylacetic acid were decreased and increased (49% and 76.6%), respectively, but not in entorhinal cortex and striatim. The turnover rates of dopamine were increased in hippocampus and frontal cortex (114.8 and 131.5%, respectively). The maximum binding density of frontal cortical dopamine-1 receptor was decreased (13.8%) without changes in its affinity. Also specific binding sites of SCH23390 were decreased in entorhinal cortex, striatum and hippocampus (29.0, 23.9, and 37.3%, respectively). The maximum binding density of frontal cortical dopamine-2 receptor was also decreased (23.6%) without changes in its affinity. Also specific binding sites of spiperone were decreased in hippocampus and striatum (26.0 and 49.1%, respectively), but not in entorhinal cortex. The results indicated that the lesions of entorhinal cortex induced the alterations of dopaminergic activities in various brain regions and suggest that the altered dopaminergic activities may contribute in the impairments of memory processes.

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Different action on amino acid neurotransmitters in rat brain regions by exposure to extremely low frequency magnetic field

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Groups of Sprague Dawley rats (4-5 rats each) were exposed to 20 G extremely low frequency magnetic field (ELF MF, 60 Hz) or sham for 5 days. Rats were decapitated and brain samples were isolated regionally in cortex, cerebellum, striatum, thalamus and hippocampus to determine the level of amino acid neurotransmitters (glutamic acid, glutamine, aspartic acid, glycine taurine, tyrosine and GABA). At 20 G MF exposure, there were overall different changes in amino acid neurotransmitters level with increase in thalamus and striatum, and with decrease in cortex, cerebellum and hippocampus. In contrast to significant elevation in striatum and thalamus, GABA decreased in cortex and hippocampus. Glutamine and glycine showed also similar pattern of level changes to GABA. The level of excitatory amino acid, glutamic acid, was significantly enhanced by MF exposure in thalamus, but not in other regions. Another excitatory amino acid, aspartic acid, was observed to decrease only in cortex. Significant increase of tyrosine, precursor of catecholamines, occurred in thalamus. From the present findings, it may be hypothesized that MF may produce change of level of amino acid neurotransmitters in animals, and affect brain regionally.

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In vivo effects of extremely low frequency magnetic field on nitric oxide in rat brain.

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